

Amdt. dated May 29, 2003
Reply to Office action of 01/21/2004

Serial No. 09/687,668
Docket No. SJO920000156US1
Firm No. 0037.0041

REMARKS/ARGUMENTS

Obviousness rejections

The Examiner rejected pending claims 1-34 under 35 U.S.C. §103 as being obvious over Vahalia (US 6,389,420) in view of Banga (US Patent Application No. 2001/0020248).

Applicants have amended independent claims 1, 19 and added four new dependent claims.

Applicants have also corrected grammatical errors in certain claims and amended certain dependent claims. Applicants traverse the rejections.

Claim 1

The Examiner has rejected claim 1 under 35 §U.S.C. 103 as being obvious over Vahalia in view of Banga (Office Action: pages 2-3).

Applicants have amended claim 1 to include the limitation that the storage device is a shared storage device between the first node and the second node. The added claim limitations may be found in at least FIG. 1 (elements 36, 16, 20), 3rd paragraph (starting "The network pathways) of page 9 of the specification, and in pages 9-20 of the specification.

Pending independent claim 1 requires a digital data processing system with improved access to information stored on a storage device, said system comprising a plurality of first nodes and a second node coupled to one another over a communications pathway, the second node being coupled to the storage device for determining meta data including block address maps to file data in the storage device, and the first nodes being configured for accessing file data from the storage device using said meta data, wherein said system comprises:

at least one first node that caches data including meta data for a file accessed by said first node;

a file application on said first node configured to get requested file data by accessing said cached data for the file; and

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a file notification system that sends a file change notification to said first node indicating changes affecting the cached data, wherein the file application on the first node inspects the change notification and based on the change notification determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first and the second node, whereby file accesses may be effected for an extended time with data locally cached at first nodes of the system.

Nowhere does the cited Vahalia or the cited Banga teach or suggest the claim requirements that based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, wherein the storage device is a shared storage device between the first node and the second node.

The cited Banga (21-27 of Fig. 2; 0058-0060 of page 5) discusses getting data either from a cache or from a remote proxy. Nowhere does the cited Banga teach or discuss the claim requirement where the change notification is the basis for getting the cached data or data from the storage device. The difference data (elements 26, 27 of FIG. 2) in the cited Banga is different from the change notification of the claim requirements. The difference data discussed in Banga (paragraphs 25, 25 of Banga) is the difference in content between two pages. The claims require the change notification to indicate changes affecting the cached data. The difference in content between two pages (difference data) of the cited Banga is different from changes affecting the cached data (change notification) as required by the claims. Therefore the cited Banga does not teach or suggest the claims requirement that based on the change notification, the file application on the first node determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device. The Examiner acknowledges that the cited Vahalia does not teach or suggest the claim requirements that based on the change notification, the file application on the first node determines, whether to get the requested file

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data directly using said cached data or whether to get the requested file data from the storage device.

Furthermore, in the cited Banga (FIG. 2) the local proxy secures data from the remote proxy based on whether the page is cached (Banga: FIG. 2, element 21) and on the validity of cached version (Banga: FIG. 2, element 23). While the cited Banga discusses that the local proxy may have received instructions from the browser that the local proxy should not use the cached page, such instructions from the browser are different from the change notification required by the claims.

Furthermore, the cited Banga discusses a browser, a local proxy, and a remote proxy. Without prejudice to the applicants position that the instructions from the browser discussed in the cited Banga are different from the change notification required by the claims, even if for the sake of argument the instructions from the browser are the same as the change notification, the browser discussed in Banga corresponded to the file notification system required by the claims, the local proxy discussed in Banga corresponded to the first node required by the claims, and the remote proxy discussed in Banga corresponded to the second node required by the claims, then the cited Banga discusses that the first node (local proxy discussed in the cited Banga) requests data from the second node (remote proxy discussed in the cited Banga) and receives data from the second node. Therefore, the cited Banga does not teach or suggest the claim requirement that the first node determines getting the requested file data from the storage device, where the storage device is a shared storage device between the first node and the second node.

Additional reasons for the patentability of the claim are given below:

Applicants conclude from the Examiner's acknowledgments of the deficiencies of the cited Vahalia, that the cited Vahalia does not teach or suggest the claims requirements of a file notification system that sends a file change notification to said first node indicating changes affecting the cached data, wherein the file application on the first node inspects the change notification and based on the change notification determines, whether to get the requested file

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data directly using said cached data or whether to get the requested file data from the storage device, whereby file accesses may be effected for an extended time with data locally cached at first nodes of the system.

The cited Banga (58, 59 of FIG. 5; 0025 of page 2, 0062 of page 5-6) discusses a first node (local proxy) connected to a second node (remote proxy). In the cited Banga the second node (remote proxy) sends a response to the first node (local proxy) and the first node (local proxy) receives and processes the response (27 of FIG. 2, FIG. 3, 0062 of page 5-6). However, the cited Banga does not teach or suggest the claim requirement of determining on the first node, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device. The cited Banga teaches away from the claim requirement of determining whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device. In the cited Banga, the first node on receiving the response from the second node either returns the current version of the requested file from the cache or awaits transmission of the difference data. The transmission of the difference data from the second node (remote proxy) to the first node (local proxy) as discussed in the cited Banga is different from the claim requirement of the first node determining whether to get the requested file data from the storage device. In the cited Banga, the first node (local proxy) just waits for getting the difference data from the second node (remote proxy). The claims require the first node to determine whether to get the requested file data from the cached data or from the storage device coupled to the second node. Additionally, the cited Banga discusses that the first node waits for the difference data. However, the difference data discussed in the cited Banga is may only be a part of requested file data of the claim requirements and not be the requested file data.

Therefore, neither the cited Vahalia nor the cited Banga teach or suggest the claim requirements a file notification system that sends a file change notification to said first node indicating changes affecting the cached data, wherein the file application on the first node

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inspects the change notification and based on the change notification determines, whether to get the requested file data directly using said cached data or whether to get the requested file data from the storage device, whereby file accesses may be effected for an extended time with data locally cached at first nodes of the system, wherein the storage device is a shared storage device between the first node and the second node.

For the above reason, claim 1 is patentable over the cited art, either alone or in combination.

Claims 2-12

The Examiner has also rejected pending claims 2-12 that depend directly or indirectly on independent claim 1 which is patentable over the cited art for the reasons discussed above. Moreover, the following of these claims provide additional grounds of patentability over the cited art for the reasons discussed below.

Claim 2

Pending claim 2 depend from claim 1, and add the requirement that the file application on said first node determines whether requested file data is subject to a change notification, and if so makes a further determination whether cached data at said first node remains valid for the requested file data.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 2 are discussed.

The Examiner has cited the abstract of Vahalia in rejecting claim 2. The abstract of Vahalia discusses exchange of locks between a first node and a second node and the accessing of data based on the lock. Nowhere does the cited abstract of Vahalia teach or suggest the claim requirement of determining whether the requested file data is subject to a change notification.

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Accordingly claim 2 provides additional grounds of patentability over the cited art.

Claim 3

Pending claim 3 depends from claim 1, and adds the requirement that the file application on said first node,

- i) determines whether requested file data is subject to a change notification, and
- ii) applies the cached meta data to directly mount the storage device to access the requested file when the cached data is not subject to a change notification.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 3 are discussed.

In the cited Vahalia (68 of FIG. 7, 70, 72 of FIG. 7) step 68 is performed if the first node has modified the metadata. The claims require the file application of the first node to determine whether requested file data is subject to a change notification and nowhere does the cited Vahalia teach or suggest the claim requirement.

Accordingly, claim 3 is patentable over the cited art.

Claim 7

Independent claim 7, depends on claim 1, wherein the file notification system runs on the second node and interfaces with a file system meta data controller to detect changes in file system storage data, issuing a file change notice in response thereto.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 7 are discussed.

The cited Vahalia (col. 22, lines 37 - col. 23, lines 42) refer to software for the first node (client of Vahalia: Vahalia col. 22, line 37) and procedure followed by the first node's operating

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system (col. 22, line 67). The claims require the file notification system to run on the second node and nowhere does the cited Vahalia teach or suggest the file notification system to run on the second node.

Therefore, claim 7 is patentable over the cited art.

Claim 8

Pending claim 8 depends from claim 1, wherein the file notification system limits number of change notifications for a given file to first n changes that occur, where n is a positive integer.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 8 are discussed.

The cited Vahalia (col. 15, lines 32 to col. 16 lines 41) discusses locks does not require change notifications as required by the claims. Furthermore, the cited Vahalia does not teach or suggest a numerical limit (because n is an integer in the claims) on the number of change notifications.

Therefore, claim 8 is patentable over the cited art.

Claim 9

Claim 9 depends from claim 1, wherein the file application on the first node implements a decision algorithm to determine whether to apply cached data for a requested file when the requested file is subject to a change notification.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 9 are discussed.

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Nowhere does the cited Vahalia (67-72 of FIG. 7) teach or suggest that the requested file is subject to change notification as required by the claims. Block 67 of the cited Vahalia discusses whether the client has modified the metadata. This is different from the change notification as required by the claims. The cited Vahalia discusses whether the first node has changed the metadata, whereas the claims require a change notification to be examined at the first node.

Therefore claim 9 is patentable over the cited art.

Claim 11

Claim 11 depends from claim 10, wherein the file system management tasks performed by the second node include publication of change data.

The Examiner has mentioned that Banga discusses the invention substantially as claimed without citing any specific parts of Banga. Applicants request the Examiner to cite where in Banga the requirements of claim 11 are discussed.

The cited Vahalia (col. 9, lines 49-58) discusses granting locks and comparison of metadata version numbers. Nowhere, does the cited Vahalia teach or suggest the file system management tasks performed by the second node include publication of change data.

Therefore claim 11 is patentable over the cited art.

Claims 13, 15-17, 18-24, and 26

The Examiner has rejected claims 13, 15-17, 18-24 and 26 based on the analysis of claim 1-7, and 9-12 and Applicant traverses the rejections based on the above arguments for claims 1-7 and 9-12. Moreover, the following of these claims provide additional grounds of patentability over the cited art for the reasons discussed below.

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Claim 13

The Examiner has rejected claim 13 under 35 §U.S.C. 103 as being obvious over Vahalia in view of Banga. Applicants traverse.

Pending independent claim 13 is a digital data processing system, comprising a first node and a second node coupled for communication:

a storage device coupled for communication with at least the first node; and

a cache memory coupled to and associated with the first node, the cache memory storing administrative data pertaining to files on the storage device,

the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data.

Neither the cited Vahalia nor the cited Banga teach or suggest the claim requirement of the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data.

It can be concluded from the Examiner's acknowledgments (Office Action : Page 3, lines 11-15) that the cited Vahalia does not discuss the claim requirement of the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data.

Nowhere does the cited Banga discuss the claim requirement of the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data. The cited Banga (58, 59 of FIG. 5; 0025 of page 2, 0062 of page 5-6) discusses a first node (local proxy) connected to a second node (remote proxy). In the cited Banga the second node (remote proxy) sends a response to the first node (local proxy) and the first node (local proxy) receives and processes the response (27 of FIG. 2, FIG. 3, 0062 of page 5-6). However, the cited Banga does not teach or suggest the claim requirement of notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data. Banga discusses sending a "mime" multi-part message from the

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second node to the first node which is different from the claim requirements of the changes to administrative data pertaining to files. Banga discusses that the first node determines whether or not the first part of the multi-part message from the second node identifies the transmitted data from the first node as a stale version of the requested page (0062 of the cited Banga). However, the claims require the second node notifying the first node of changes to administrative data pertaining files for which the cache memory stores administrative data. Therefore, the multi-part message of the cited Banga is different from the administrative data of the claim requirements.

Therefore claim 13 is patentable over the cited art, either alone or in combination.

Claim 18

The Examiner has rejected claim 18 under 35 §U.S.C. 103 as being obvious over Vahalia in view of Banga. Applicants traverse.

Pending independent claim 18 is a method of sharing storage access in a digital data processing system having a first node and a second node coupled for communication and a storage device coupled for communication with at least the first node, such method comprising the steps of:

 caching in a cache memory coupled to and associated with the first node, administrative data pertaining to files on the storage device;

 communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data; and

 determining, in the first node, whether to apply said cached data for accessing a file thereby reducing network communications.

Neither the cited Banga nor the cited Vahalia teach or suggest the claim requirement of caching in a cache memory coupled to and associated with the first node, administrative data pertaining to files on the storage device, and communicating, to the first node, changes to

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administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for accessing a file thereby reducing network communications.

It can be concluded from the Examiner's acknowledgments (Office Action : Page 3, lines 11-15) that the cited Vahalia does not discuss the claim requirement of communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for accessing a file.

Nowhere does the cited Banga discuss the claim requirement of communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for accessing a file. The cited Banga (58, 59 of FIG. 5; 0025 of page 2, 0062 of page 5-6) discusses a first node (local proxy) connected to a second node (remote proxy). In the cited Banga the second node (remote proxy) sends a response to the first node (local proxy) and the first node (local proxy) receives and processes the response (27 of FIG. 2, FIG. 3, 0062 of page 5-6). However, the cited Banga does not teach or suggest the claim requirement of communicating, to the first node, changes to administrative data pertaining to files for which the cache memory stores administrative data and determining, in the first node, whether to apply said cached data for accessing a file. Banga discusses sending a "mime" multi-part message from the second node to the first node which is different from the claim requirements of the changes to administrative data pertaining to files. Banga discusses that the first node determines whether or not the first part of the multi-part message from the second node identifies the transmitted data from the first node as a stale version of the requested page (0062 of the cited Banga). However, the claims require that the second node to send administrative data pertaining to files whose administrative data is stored in the cache of the first node. Therefore, the multi-part message of the cited Banga is different from the administrative data of the claim requirements.

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For the above reason, claim 18 is patentable over the cited art.

Claim 19

The Examiner has rejected 1 under 35 §U.S.C. 103 as being obvious over Vahalia in view of Banga (Office Action: pages 2-3). Applicants have amended claim 19 to add the requirement that the storage device is a shared storage device between the first node and the second node. The added claim limitations may be found in at least FIG. 1 (elements 36, 16, 20), 3rd paragraph (starting "The network pathways") of page 9 of the specification, and in pages 9-20 of the specification.

Amended independent claim 19 is a digital data processing method for improved access to information stored on a storage device, wherein the system includes a storage device, a plurality of first nodes and a second node communicating over a communications pathway, the second node being coupled to the storage device for determining meta data for accessing file data in the storage device, and the first nodes being configured for accessing file data from the storage device using said meta data, wherein said method is characterized by the steps of:

 caching meta data for a file accessed by said first node in a cache memory of said first node;

 providing a file application on said first node configured to get requested file data utilizing said cached data;

 storing file change notifications at said first node indicating changes that may affect the cached data; and

 determining, based on said change notifications, whether said file application may utilize the cached data for a requested file or whether said file application accesses the requested file from the storage device, wherein the storage device is a shared storage device between the first node and the second node.

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The Examiner has rejected claim 19 based on the analysis of claim 1-7, and 9-12.

Applicant maintains the patentability of amended claim 19 based on the arguments in support of amended claim 1, and claims 6-7, 9-12.

For the above reasons claim 19 is patentable over the cited art, either alone or in combination.

Claim 25

Examiner appears not to have indicated specifically why claim 25 has been rejected.

Amended Claims 27-30

Claims 27-30 have been amended to depend on newly added claims 35-38 respectively. Amended claim 27 depends on claim 35 and requires that the file notification system runs on the second node and sends the file change notification to the first node, wherein the first node is registered with the second node for receiving the file change notification, wherein the file change notification includes changes to the data and the meta data.

The cited Banga (58,59 of fig. 5; and 0069, 0070 of page 6) discuss difference data which is different from the file change notification as required by the claims. Furthermore, in the cited Banga the first node (local proxy) can possibly be registered with the browser and not the second node (the remote proxy) for receiving any type of change notification because in the cited Banga the browser advises the local proxy whether the cached data is current. Therefore, the cited Banga does not teach or suggest the claim requirement that the first node (local proxy) is registered with the second node (remote proxy) for receiving the file change notification. In the cited Banga, the browser and not the remote proxy advises the first node (local proxy).

For the above reasons claims 27-30 is patentable over the cited art, either alone or in combination.

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Amended Claims 31-34

Claims 31-34 have been amended to include the requirement that the storage device coupled to the second node also coupled to the first node. The added requirements may be found in at least FIG. 1 (elements 36, 16, 20), 3rd paragraph (starting "The network pathways") of page 9 of the specification, and in pages 9-20 of the specification.

Amended claim 31, is the data processing system of claim 1, wherein if the change notification indicates that changes that affect the cached data have been made, then the requested file data is obtained from the storage device coupled to the second node, wherein the storage device coupled to the second node is also coupled to the first node.

The Examiner has rejected claims 31-34 by citing FIG. 1 of Banga and mentioned that the file data is obtained from the network to the network service provider before forwarding to the user station. Therefore, in the cited Banga, the file data is obtained from the network which is not coupled to the user station/local proxy (first node). The claims require storage device from which the data is obtained to be also coupled to the first node. Therefore, the cited Banga discusses obtaining the data at the first node from the storage device that is not coupled to the first node but is only coupled to the second node, whereas the claims require obtaining the data at the first node from the storage device that is coupled to both the first node and the second node.

Therefore, claims 31-34 are patentable over the cited art because the cited art does not teach or suggest, either alone or in combination, all the claims limitations.

New Claims 35-38

The added requirements of new claims 35-38 may be found in at least lines 16-24 of page 5 of the specification, 3rd paragraph (beginning "The network pathways...") of page 9 of the specification, FIG. 1 (elements 36, 16, 20), and in pages 9-20 of the specification.

Conclusion

For all the above reasons, Applicant submits that the pending claims 1-38 are patentable over the art of record. Applicants has added four new claims and indicated fees to be charged. Nonetheless, should any additional fees be required, please charge Deposit Account No. 50-0585.

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The attorney of record invites the Examiner to contact him at (310) 557-2292 if the Examiner believes such contact would advance the prosecution of the case.

Dated: April 21, 2004

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